



INTERNATIONAL JOURNAL OF RESEARCH IN PHARMACY AND LIFE SCIENCES

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Determination of soluble extractive of some medicinal plants of Genus *Sesbania*

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Abstract

The seasonal variation of water soluble extractive alcohol soluble extractive and ether soluble extractive have been investigated in leaves, wood and bark of *Sesbania rostrata*, *Sesbania exaltata* and *Sesbania sesban*. Comparative account of water soluble extractive of leaves, wood and bark of *Sesbania rostrata* was showed high level (range from 3.53 to 6.43%) than *Sesbania exaltata* (range from 3.26 to 6.02%) and *Sesbania sesban* (range from 2.73 to 5.67%) in all seasons. Alcohol soluble extractive of leaves of *Sesbania rostrata* showed higher (range from 6.97 to 7.78%) and lower in bark of *Sesbania sesban* (range from 3.90 to 4.34%). Ether soluble extractive of leaves of *Sesbania rostrata* showed higher (range from 3.90 to 4.43%) and lower in bark of *Sesbania sesban* (range from 1.85 to 2.11%).

Key words: water, alcohol and ether soluble extractive, medicinal plant, *Sesbania*

Introduction

The genus *Sesbania* belong to the family Leguminosae and its subfamily is Papilionoideae. There are four subgenera of which *Sesbania* and *Agati* are of agricultural value. Member of the genus *Sesbania* are known for exceptionally fast growing rates as well as a very high affinity for association with several nitrogen fixing Rhizobia in the soil that cause formation of numerous and large nodules in the plant roots. Member of this genus also have several potential uses including forage, poles for light construction, fuelwood, pulpwood, live fences, medicines, shade trees for other crops and gums. Medicinal plants have been used as traditional treatments for numerous human diseases for thousands of years. Medicinal properties of plants are due to the active chemical constituents present in different parts of the plant (Mitscher et al, 1980). Medicinal plants continue to be an important therapeutic aid for the ailments of humankind. The search for eternal health and longevity and for remedies to relieve pain and discomfort drove early man to explore his immediate natural surroundings and led to the use of many plants, animal products and minerals, etc. and the development of a variety of therapeutic agents. Today, there is a renewed interest in traditional medicine and increasing demands for more drugs from plant sources. This revival of interest in plant-derived drugs is mainly due to the current widespread belief that "green medicine" is safe and more dependable than the costly synthetic drugs, many of which have adverse side effects. Nature has bestowed upon us a very rich botanical wealth and a large number of diverse types of plants grow wild in different parts of our country. The seasonal variation of water soluble extractive alcohol soluble extractive and ether soluble extractive have been investigated in leaves, wood and bark of *Sesbania rostrata*, *Sesbania exaltata* and *Sesbania sesban*.

Sesbania rostrata as an important dietary nutritive source in Southeast Asian country's. *Sesbania rostrata* are richest source of amino acid, minerals and antioxidants vitamins. This species is unique because it fixes nitrogen not only in its roots in the soil, but also in its aerial parts including stems and branches (Dutt et al., 1983). Various parts of this plant are used in Indian traditional medicine for the treatment of diuretic, emetic, fevers, headaches, anemia, bronchitis, inflammation, leprosy, gout, rheumatism, anxiolytic, anticonvulsive and hepatoprotective (Pari and Uma, 2003). It also has anti-inflammatory, analgesic and antipyretic activity (Momin et al., 2012). Primarily used as green

manure between rice crops (Shahjalal and Topps , 2000). *Sesbania exaltata* is a crop generally cultivated for its nutritive value to soil. It is cultivated in monsoon season almost throughout India and grows sandy, loamy and clay soils. It is an ideal green manure crop as it is quick-growing, succulent, and easily decomposable with low moisture requirements and produces maximum amount of organic matter and nitrogen in the soil. Seed flour is used in the treatment of ringworm, skin diseases and wounds. The mature seeds of this species are known to be cooked and eaten by the Indian tribal's (Brown, 1954).

Sesbania sesban seeds considered stimulants and astringent. Leaves considered purgative, anthelmintic and anti-inflammatory. Leaves showed a high crude protein content, 25 to 30% and is a useful source of protein for ruminant diets and a source of supplement fodder for livestock. Study of the effect of *Sesbania sesban* seed powder on female albino rats showed inhibition of ovarian function, change of uterine structure and prevention of implantation with 100 % control of fertility (Shiv Pal Singh , 1990). The aqueous extracts of leaves in STZ-induced diabetic rats showed significant increase in serum insulin and HDL level and decreases in blood glucose , total cholesterol and triglycerides when compared to glibenclamide (Pandhare et.al.,2011). According to Brown (1954), feeding *Sesbania sesban* leaves to cattle is believed to increase their milk production. *Sesbania sesban* was referred to as milk shrub. Farmers were encouraged to feed *Sesbania* fodder to lactating cows to enhance milk secretion (Brown, 1954).

Materials and Methods

Determination of water soluble Extractive -1gm of air dried drug, coarsely powdered was macerated with 100ml of distilled water in a closed flask for twenty four hours shaking frequently. Solution was filtered and 25 ml of filtrate was evaporated in a tarred flat bottom shallow dish, further dried at 1000 C and weighted. The percentage of water soluble extractive was calculated with reference to the air dried drugs. Determination of alcohol soluble extractive -1 gm. of air dried drugs, coarsely powdered was macerated with 100 ml. alcohol in closed flask for 24 hrs. with frequent shaking. It was filtered rapidly taking precaution against loss of alcohol. 25ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 1000C and weighted. The percentage of alcohol soluble extractive was calculated with reference to air dried drug.

Determination of Ether- soluble Extractive -1gm of air dried drug, coarsely powdered was macerated with 100 ml of ether in a closed flask for twenty four hours with frequent shaking. It was filtered rapidly, taking precautions against loss of ether. 25 ml of filtrate was then evaporated in a tarred flat bottom shallow dish, dried at 1000C and weighted. The percentage of ether soluble extractive was calculated with reference to the air dried drug.

Results and Discussion

Different plant species would obviously have different chemical profile. Chemical present in the plant material could be dissolved in different solvent for the purpose of further analysis. Therefore, three solvents - water, alcohol and ether were selected to determine the soluble substance, this was again carried out in three seasons viz. summer, monsoon and winter continuously for two years.

Sesbania rostrata -The summer collection of leaves showed higher content (6.43 %) of water soluble extractive as compared to winter (6.12 %) and monsoon (5.44%). However, the summer sample of bark exhibited higher (4.03 %) as compared to monsoon and winter (3.53 % and 3.78) respectively (Table). In Wood summer shows higher content of water soluble extractive (4.86 %) as compared to winter (4.56 %) and monsoon (4.15 %). The range of alcohol soluble extractive in leaves (ranged from 6.97 % to 7.78 %). Highest concentration being observed during summer season (7.78 %). Ether soluble extractive of bark showed the ranged of (3.77 % to 4.22 %) for three seasons tested. The wood having concentration of (4.87 % to 5.52 %) ether soluble extractive of all seasons. The range of ether soluble extractive in leaves (ranged from 2.12 % to 4.43 %). Highest concentration being observed during summer season (4.43 %). Ether soluble extractive of bark showed the ranged of (2.12 % to 2.67 %) for three seasons tested. The wood seemed to be having concentration of (2.93 % to 3.55 %) ether soluble extractive when compared to leaves, and bark during two seasons examined.

Sesbania exaltata -The water soluble extractive from leaves were comparatively raised in summer (6.02 %) over that of winter (5.68 %) and monsoon (5.17 %). The water soluble extractive percentage was notice (range from 4.05 % to 4.58 %) in wood during the different season tested (Table 1). In bark, the water extractive percentage ranges from 3.26 % to 3.87 %, summer show higher 3.87 % as compared to winter (3.54 %) and monsoon (3.26 %). Leaves extracted with alcohol showed the concentration of 6.50 % to 7.10 % during various seasons tested (Table.1). The summer bark accumulated maximum levels of alcohol soluble matter (4.86 %) over that of monsoon (4.20 %) and winter (4.62 %). The alcohol soluble extractive from wood was comparatively raised in summer (6.13 %) over that of winter (5.80 %) and monsoon (5.69 %). The leaves ether soluble extractive maximum at summer (3.90 %) as compared to winter (3.62 %) and monsoon (3.29 %). The bark, ether soluble extractive maximum at summer (2.45

%) as compared to winter (2.22 %) and monsoon (2.01 %). The wood exhibited percentage of ether soluble extractive (range from 2.77 % to 3.12 %) The range of water, alcohol and ether soluble extractive were found to be in increasing order of Bark < Wood < leaves. (Table. 1).

Sesbania sesban -The water soluble extractive content was measured in the leaves of three seasons for two years and found that the leaves stored (5.67 %) of extractives during summer. When compared to monsoon (4.89 %) and winter (5.34 %). Similarly, summer bark were able to maintain higher levels of water soluble extractive during summer (3.07 %) over than of other season (Table 1) . The wood exhibited ,comparatively low percentage of water soluble matter as compare to leaves it ranges from (3.22 % to 3.94 %). The alcohol soluble studies conducted in different season of two year period gave a clue that the summer collection of leaves, wood and bark were the richest source of alcohol soluble matter (6.34 %, 5.67 % and 4.34 % respectively) when compared to other season (Table 1). Like water soluble extractive of bark, the alcohol soluble matter of bark had low concentration among other plant parts tested in various seasons. It was commonly observed in ether extractive percentage that the leaves showed higher concentration i.e. (2.55 % to 3.12 %) than bark and wood (range from 1.85 % to 2.11 % and 2.25 % to 2.78 %) (Table.1). The range of water alcohol and ether soluble extractive were found to be in increasing order of bark < wood < leaves (Table .1).

Table 1- Determination of Extractive percentage of Sesbania rostrata, Sesbania exaltata and Sesbania sesban.

Plant parts	Season	Water soluble extractive (%)			Alcohol soluble Extractive (%)			Ether soluble extractive (%)		
		Plant 1	Plant 2	Plant 3	Plant 1	Plant 2	Plant 3	Plant 1	Plant 2	Plant 3
Leaves	Summer	6.43	6.02	5.67	7.78	7.10	6.34	4.43	3.90	3.12
	Monsoon	5.44	5.17	4.89	6.97	6.50	5.79	3.90	3.25	2.55
	Winter	6.12	5.68	5.34	7.33	6.85	6.07	4.11	3.62	2.89
Wood	Summer	4.86	4.58	3.94	6.52	6.13	5.67	3.55	3.12	2.78
	Monsoon	4.15	4.05	3.22	5.87	5.69	5.12	2.93	2.77	2.25
	Winter	4.56	4.24	3.63	6.21	5.80	5.35	3.32	2.91	2.52
Bark	Summer	4.03	3.87	3.07	5.22	4.86	4.34	2.67	2.45	2.11
	Monsoon	3.53	3.26	2.73	4.77	4.20	3.90	2.12	2.01	1.85
	Winter	3.78	3.54	3.91	5.03	4.62	4.17	2.37	2.22	2.00

Plant 1 - Sesbania rostrata, Plant 2- Sesbania exaltata and Plant 3- Sesbania sesban.

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